

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)	
Hajime Kondou)	Group Art Unit: 1796
Application No.: 10/537,698)	Examiner: MULCAHY PETER D
Filed: June 6, 2005)	Confirmation No.: 7192
For:)	
NATURAL RUBBER LATEX, NATURAL RUBBER, RUBBER COMPOSITION AND TIRE USING THE SAME		

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Takahiko Matsui, declare the following:

1. I am a graduate of The University of Tokyo, Graduate School of Frontier Science. My discipline is medical genome science.

2. I have been employed by Bridgestone Corporation since 2006 and have been conducting research and development in the field of rubber and tire until the present time.

3. I am familiar with the prosecution of the present application, particularly the Official Action notified on October 27, 2009 in which the Examiner rejected the claims in the above-identified application under 35 U.S.C. 103(a) over a reference of the prior art.

4. The following experiment was carried out by me.

Experiment

It was carried out to add the Comparative Production Examples 2, 3 and 4.

<The Comparative Production Example 2>

An anionic surfactant [manufactured by KAO Co., Ltd.; "DEMOL"; the concentration of the surfactant: 2.5% by weight] in an amount of 24.7 ml and 7.5 g of protease (manufactured by NOVOZAIMS; "ALKALASE 2.5L, TYPE DX") were added into and mixed with 136 g of water and a solution was prepared (1).

Then, while 1,000 g of natural rubber latex having a content of solid components of 15% by weight was kept at a temperature of 40 DEG C in a water bath and stirred, the solution (1) was added to the natural rubber latex. The resultant mixture was kept being stirred for 5 hours at the same temperature and the natural rubber latex was obtained.

The obtained latex was coagulated and dried by the same method as Production Example 1 of the present specification. The natural rubber thus obtained was designated as G.

<The Comparative Production Example 3>

This Example is treated by the same method as Production Example 3 of the present specification at the preceding step.

Levenol WX (sodium polyoxyethylenealkylethersulfate: manufactured by Kao Corporation) 1.5 g as a surfactant and a cellulase enzyme (Cellulase A [Amano] 3: manufactured by Amano Enzyme Co., Ltd.) 0.15 g were added to 1000 g of latex obtained by adding water to natural rubber latex treated with clonal specie GT-1 and 0.4 wt % of NH₃ to control a solid content to 15 wt %, and the latex was stirred and dispersed. Then, it was left standing still for

15 hours.

Further, the above solution (1) was added to the natural rubber latex. The resultant mixture was kept being stirred for 5 hours at the same temperature and the natural rubber latex was obtained.

The obtained latex was coagulated and dried by the same method as Production Example 1 of the present specification. The natural rubber thus obtained was designated as H.

<The Comparative Production Example 4>

In accordance with the same procedures as those conducted in Comparative Production Example 3, except that the amount of the added protease was 0.11 g, the natural rubber latex was obtained.

Natural rubber latex was treated by centrifugation using a latex separator SLP-3000 (manufactured by SAITO ENSHINKI KOGYO) at a rotation speed of 7,500 rpm and the obtained latex was coagulated and dried by the same method as Production Example 1 of the present specification. The natural rubber thus obtained was designated as I.

The Measurement of the total nitrogen content, the Mooney viscosity (ML₁₊₄, 130 °C), Tb (MPa), Tan δ, and Aging resistance (Index) of Production Example 3 and Comparative Examples are shown in the following Tables 1 and 2.

Production Example 3 of the present specification was also shown in the Tables 1 and 2 for the comparison. Measurement of the total nitrogen content and Aging resistance (Index) of a vulcanized rubber were measured in accordance with the following methods.

(1) Measurement of the total nitrogen content

The total nitrogen content was measured in accordance with

the Kjeldahl method and expressed as the fraction based on the entire amount (% by weight).

(2) Aging resistance (Index)

The tensile strength obtained after heat aging at 100 DEG C for 72 hours was divided by the tensile strength before the heat aging and the result is expressed as the percentage. The greater the obtained value, the more excellent the aging resistance.

The Comparative Production Example 2 and 3 using a protease are not improved in Tb and $\tan \delta$ thereof when they compare with the Production Example 3 in which a Cellulase is only used. For example, in the Production Example 3 in which only used is a cellulase (0.15 g), Tb is 27.1 and $\tan \delta$ is 0.194. In the Comparative Production Example 2 in which only used is a protease (7.5 g), Tb is 23.9 and $\tan \delta$ is 0.221. And, in the Comparative Production Example 3 in which used are a cellulase (0.15 g) and a protease (7.5 g), Tb is 24.9 and $\tan \delta$ is 0.218.

And, in the Comparative Production Example 4 using a cellulase and a protease and treated by centrifugation, the aging resistance thereof grows more worse when it compares with the Production Example 3 in which a Cellulase is only used.

Table 1

Natural rubber	Cellulase used	Protease used	centrifugation treated	total nitrogen content
C	0.15g	-	-	0.47
G	-	7.5g	-	0.055
H	0.15g	7.5g	-	0.055
I	0.15g	0.11g	+	0.17

Table 2

	Natural rubber used	Compound Mooney viscosity (ML ₁₊₄ , 130°C)	Tb (MPa)	tan δ	Aging resistance index
Example 3	C	59	27.1	0.194	49
Comparative Example 2	G	61	23.9	0.221	43
Comparative Example 3	H	46.4	24.9	0.218	43
Comparative Example 4	I	50.2	28	0.179	37

5. I further declare that all statements made herein of my own knowledge are true and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Date: 25 / 03 / 2010 By: Takahiko Matsui
Takahiko Matsui
(Print Declarant's name)